



MONTHLY WEATHER REVIEW.

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BOARD OF EDITORS { Mr. Horace E. Smith, Chief Clerk of Weather Bureau,
Professors Henry A. Hazen, Thomas Russell, and Charles F. Marvin, and
Mr. Edward B. Garriott, in charge of Review Room.

INTRODUCTION.

This REVIEW is based on reports for April, 1893, from 3,054 regular and voluntary observers. These reports are classified as follows: 166 reports from Weather Bureau stations; 42 reports from United States Army post surgeons; 2,115 monthly reports from state weather service and voluntary observers; 214 reports through the Southern Pacific Railway Company; 487 marine reports through the co-opera-

tion of the Hydrographic Office, Navy Department; 30 reports from Canadian stations; marine reports through the "New York Herald Weather Service"; monthly reports from local services established in all states and territories; and international simultaneous observations. Trustworthy newspaper extracts and special reports have also been used.

Reports of voluntary observers in Oregon were not received in time to be used in the preparation of this REVIEW.

CHARACTERISTICS OF THE WEATHER FOR APRIL, 1893.

TEMPERATURE.

In the Southern States east of the Rocky Mountains the month was the warmest, and in the Northwestern States, over the middle and northern plateau regions, and on the north Pacific coast it was the coolest April on record. The principal cold wave of the month advanced from the Missouri Valley to the Gulf and south Atlantic states from the 12th to the 15th, carrying the frost line to Oklahoma and thence over Tennessee. On the 7th, 8th, and 13th frost damaged fruit at points in California. Frost was noted on the 22d in Tennessee and northeastern Alabama, and on the 23d and 24th in northern Georgia and the Carolinas.

PRECIPITATION.

In the Ohio and upper Mississippi and lower Missouri valleys, in Washington, and at Block Island, R. I., the monthly precipitation was the greatest, and on the middle and south-east slopes of the Rocky Mountains, over the southern plateau region, and at Fort Buford, N. Dak., and Charlotte, N. C., it was the least ever reported for April. In New York, the Ohio, upper Mississippi, and Missouri valleys, and in western Colorado, Utah, and Washington cold and wet weather interfered with farming operations. In the south Atlantic and east Gulf states, central Texas, and east-central and southeastern Colorado the month was unusually dry. Heavy snowstorms visited New York and New England on the 7th, the Northwestern States on the 11th, 12th, 19th, and 20th, the Cascade Mountain region, Washington, on the 20th and 21st, and southwestern Utah on the 29th and 30th. The total depth of snowfall was 20 to 30 inches at points in northwestern Massachusetts, north-central New York, northern Wisconsin, western South Dakota, Wyoming, southwestern Utah, eastern Nevada, and west-central Montana.

STORMS.

The month was marked by exceptionally destructive tornadoes and thunderstorms in the Western and Southwestern States. One hundred and fourteen lives are known to have been lost, and property to the estimated value of over \$1,000,000 was destroyed. The first group of storms visited Missouri, Iowa, and the lower Ohio Valley on the 11th and extended over southern Lower Michigan during the 12th. On those dates 38 persons were reported killed, and the property loss was placed at over \$500,000. The storms of the night of the 11th and the 12th in Missouri and the upper Mississippi valley were anticipated by warnings sent from this office the afternoon and evening of the 11th, announcing the probability of severe local storms in Missouri and eastern Iowa. The observer at Dubuque, Iowa, reports that much valuable river property, at that point, was saved by the timely warning.

The tornadoes that visited Oklahoma and northeastern Texas on the 25th caused the loss of 34 lives, of which number 30 are credited to Cleveland County, Okla. The morning of the 28th, the date of the Cisco, Tex., tornado, in which 22 lives were lost and property to the value of \$400,000 was destroyed, a warning of severe local storms for the north part of eastern Texas was issued by the Weather Bureau. The Great Lakes were swept by storms of great violence during the month, the period extending from the 19th to the 21st being especially notable for the prevalence of destructive gales. The Lake storms of those dates were announced by signal orders and special warnings sent by the Weather Bureau to all Lake ports the early morning of the 19th.

OPENING OF NAVIGATION.

Navigation opened on the Mississippi and Missouri rivers and all of the Great Lakes, except Lake Superior.

Chicago, Ill., Milwaukee, Wis., and Grand Haven, Mich., reported a tidal wave on the 7th.